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NIF/LMJ Prototype Amplifier Mechanical Design*

J. Horvath, S. Rodriguez, J. Fornerod, P. Bosch, T. Alger, T. Lee,
D. Swort, S. Seznec, A. Erlandson
Lawrence Livermore National Laboratory
P.O. Box 808, L-490, Livermore, CA 94550
Phone: (510) 422-1486; FAX: (510) 422-7748; email: horvath1@llnl.gov

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Amplifier prototypes for the National Ignition Facility (NIF) and the Laser Megajoule (LMJ) will be tested in the Amplifier Laboratory/Laboratoire Amplificateur (AMPLAB/LABAMP) at Lawrence Livermore National Laboratory. The prototype amplifier design uses cassette-based maintenance with bottom access. Amplifiers consist of a structurally supported frame assembly unit (FAU) that forms the framework for various removable cassettes. Slab cassettes contain four glass slabs and associated silvered pump cavity reflectors. Flashlamp cassettes contain six (side array) or eight (central array) flashlamps and associated silvered flashlamp cavity reflectors. The FAU, the receptacle for the cassettes, also supports the blast shields, flashlamp electrical connections, and cooling gas plumbing for amplifier components. Guillotine interfaces designed and manufactured in France form a removable seal between FAUs. The guillotines allow an FAU to be removed without disturbing neighboring modules. A sealed Maintenance and Transfer Vehicle (MTV) or Vehicule de Transport et de Transfert (VTT) is a portable clean container that forms a sealed passage between itself and the amplifier or the assembly fixture for transfer of the slab cassette. This system permits rapid replacement of laser optical components without requiring a clean environment in the laser building. Slab cassettes are assembled in a fixture housed in an elevated clean room. A clean crane with a vacuum gripper handles laser slabs. The prototype amplifier will be used to verify amplifier performance (gain, wavefront), mechanical assembly and maintenance hardware (vehicles, assembly fixtures), guillotine interface performance, thermal recovery time, and overhead access issues.

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